

## Skill Set Requirements for Nurses Deployed with an Expeditionary Medical Unit Based on Lessons Learned

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Based in Kuwait 3 years apart, the authors recount how nurses and corps staff, along with their physician counterparts, came together to form well-run medical facilities under adverse circumstances. Their respective hospitals became competent organizations because of specific formulas for success, along with preparation, identification of required skill sets, and making improvements based on experience. This article describes the training of medical, nursing, and corps staff, the facilities and resources required for managing casualties, and some of the more commonly encountered combat injuries and conditions.

### Camp Coyote, Kuwait, 2003

In February 2003, the 1st Force Service Support Group (FSSG), 4th Health Services Battalion (HSB) was activated in support of Operation Iraqi Freedom. Active-duty health care professionals and mobilized reservists with various health care backgrounds combined forces to form a cohesive combat-support hospital located approximately 30 miles from the Iraq border, at Camp Coyote in Kuwait. This unit, the 4th HSB, was designed to deploy to an area of conflict where it would receive and treat war casualties. Regardless of the mission, and although segments of the support group had yet to arrive, this advanced-party team had the means and “can-do spirit” that allowed them to be ready to receive casualties within days of its arrival in Kuwait.

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### Brief historical review

On the same ground where Desert Storm occurred, the 4th HSB was set up to provide emergency resuscitation and definitive surgery, saving life and limb, and to offer general medical care under field and combat conditions. Medical specialties that deployed with the 4th HSB included trauma, thoracic surgery, orthopedic surgery, psychiatry, ophthalmology, general surgery, internal medicine, and family practice. The nursing staff specialties included critical care, obstetric/gynecologic, pediatric, and medical-surgical nurses, family nurse practitioners, and nurse administrators

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with varying degrees of clinical experience. The Hospital Corps staff (composed of enlisted personnel who perform patient care activities under the direction of licensed providers) consisted of individuals trained as paramedics, general duty corps staff, psychiatric technicians, pharmacy technicians, x-ray technicians, and independent duty corpsmen. Independent duty corpsmen function similarly to physician assistants. Support services included laboratory, x-ray, pharmacy, administration, and chaplaincy. Security for the entire camp was provided by the Marine Corps.

The 4th HSB was tasked to provide the services of a surgical hospital (echelon II), receiving casualties from forward deployed units. Echelons start with the simplest care closest to the battle zone (level I), where someone may put on his or her own dressing or have a comrade do so (a procedure known as “buddy aid”). If possible, this event is followed by a trip to the Battalion Aid Station, Forward Resuscitation Surgical Support unit, or Shock Trauma Platoon. At these stations, a physician, independent duty corpsman, or nurse provides first aid or advanced trauma life support, preserving life or limb. Given available transportation and a favorable battlefield scenario, ground transport or Blackhawk helicopter transport transfers the casualty to a level II facility, such as the 4th HSB, for stabilization. The casualty may move on

in a matter of hours or, if conditions dictate, may be retained for 24 to 48 hours. The next echelon (level III) is the combat zone fleet hospital or the hospital ship. Both air and ground transportation are used to move a patient to this echelon of care, as dictated by the tactical situation, the presence or absence of enemy air threats, and/or overwhelming troop movements. The final destination for definitive care is a facility outside the combat area, such as a medical treatment facility (MTF) in the continental United States [1]. “MTF” is the military term designating clinics, hospitals, and other health care facilities found in the civilian world.

The 4th HSB consisted of a receiving area (triage) that led to two operating rooms that adjoined two ICUs, each with a capacity for 12 patients. There were three wards, each with the ability to hold 30 patients. An outpatient area treated injuries that did not need inpatient care. The facility offered services including radiology, a blood bank, a small laboratory, and a pharmacy. Its purpose was to stabilize patients and transport them within 24 hours to a higher echelon level of care in Kuwait (Figs. 1–3).

#### Staff assignment, education, and training

The Bureau of Naval Personnel assigns military members to specific operational platforms



Fig. 1. Triage, Camp Coyote, 2003.



Fig. 2. ICU set-up, Camp Coyote, 2003.

(ie, hospital ships, fleet hospitals and FSSG units), with their primary duty station being an MTF [2]. For the 1st FSSG, Navy military personnel are mobilized from the Naval Medical Center San

Diego, California and Naval Reserve Unit, 4th HSB. The 4th HSB also was supported by individual augmentees, military members assigned according to their clinical specialties and the unit's



Fig. 3. Ward set-up, Camp Coyote, 2003.



needs. Total personnel for this unit consisted of 30 nurses, 66 corps staff, and 20 physicians. These numbers increased or decreased based on mission requirements (Fig. 4).

The Bureau of Navy Medicine and the commanding officers of the local supporting MTFs continually assess readiness needs and train medical personnel for their assignments accordingly. Typically, preparation for serving with fleet hospitals, FSSGs, and other ground units consists of field training with the Marines in a setting similar to the actual austere environments to which trainees will or may deploy. While serving with the Fleet Marine Force, hospital corps staff train to care for the warfighter on the battlefield. Physicians and nurses attend courses that prepare them to care for trauma patients. The Trauma Nursing Core Course (TNCC) is offered at the three main Navy MTFs and is required for all Navy nurses.

The TNCC is a fundamental course that enhances cognitive skills, sharpens technical skills, and provides a foundation for future learning to nurses actively involved in caring for injured patients. The TNCC is presented in lectures and in six psychomotor-skill stations. The focus is on airway management, spinal immobilization, initial assessment, multiple trauma intervention, and splinting. These foundational sessions allow

participants to develop and enhance their practical skills using mannequins and live models. The sessions enable nurses to become well acquainted with emergency situations and expose them to the use of the appropriate equipment. Participants learn to assess the patient, identify life-threatening emergencies, and identify and prioritize other injuries. A provider manual reinforces and supplements lectures and lessons in psychomotor skills. Each aspect of trauma is discussed using common basic themes: etiology, mechanism of injury and concurrent injuries, anatomy and physiology, pathophysiology (as a basis for key signs and symptoms), nursing care, patient education, and triage. Following completion of the course, both theoretical and practical knowledge are assessed formally by written and practical examination.

Physicians attend the Advanced Trauma Life Support Course, which teaches them to assess the patient's condition rapidly and accurately, to resuscitate and stabilize the patient according to priority, to determine if the patient's needs exceed a facility's capabilities, to arrange appropriately for the patient's definitive care, and to ensure that optimal care is provided. Another course that is available, developed by the Society of Critical Care Medicine, is the Fundamentals of Critical Care Course. This 2-day course is designed for



Fig. 4. Nurse Corps staff, Camp Coyote, 2003.

nurses and physicians who are not intensivists in critical care. It offers skills stations, lectures, and guidance for decision making during the initial hours of management of critically ill patients.

### Assessment of personnel

Because providers have different backgrounds and experience, they are assessed by the 4th HSB leadership team to determine how best to use their skills and to determine who needs training in specific assessment and skill sets. The first author was named the unit's Director for Nursing Care. He managed the clinical aspects of nursing care. Another senior nurse managed the administrative nursing functions. The Director for Nursing Care divided the nursing personnel into four groups, each containing at least two critical care nurses and corps staff trained in the Fleet Marine Force or as paramedics. Personnel then were placed in groups based on level of expertise to ensure that no one team had all the expertise. A team leader was identified to orient, train, and manage personnel in patient care. This training had to occur within a few days of arrival because of the imminent influx of casualties. This team approach proved highly successful, because those who had no trauma or critical care experience felt supported by being grouped with those who had experience (Fig. 5).

In preparation for the receipt of patients, the Director for Nursing Care and his team leaders provided personnel with refresher training, using the TNCC curriculum coupled with the team leaders' past experiences. They "got back to the basics" of nursing care. They assembled and tested medical equipment and held classes to discuss the plan of action with the threat of air or ground attack and the possible use of chemical or biologic agents. Most personnel had been trained previously, to some extent, to respond to these threats; in the field, however, such threats were compounded by the intense heat and never-ending sand storms, which created a heightened sense of anxiety. A matter of great concern was that many of these individuals had never witnessed trauma or been in a real-time combat zone. Therefore, discussing possible scenarios was extremely valuable in providing anticipatory guidance. Encouraging the staff to talk to and support each other also was extremely helpful to them. Such discussions were key to the prevention of posttraumatic stress disorder (PTSD) among



Fig. 5. Multidisciplinary rounds, Camp Coyote, 2003.

health care professionals who treat patients with combat trauma.

### Posttraumatic stress disorder

PTSD is commonly associated with soldiers plagued by horrific memories of battle. It can also be found among those who treat injured soldiers. Experiencing or witnessing a frightening event that arouses intense feelings of fear, helplessness, or horror sets the stage for PTSD. The trauma has such a strong impact that the victim cannot shake the experience and relives the painful emotions associated with it. Sudden flashbacks may occur. Other symptoms include an exaggerated startle reflex, sleep disturbances and nightmares, irritability, angry outbursts, difficulty concentrating, hallucinations, sexual dysfunction, and an inability to speak about the tragedy [3]. The austere environment and extreme weather conditions in Kuwait contributed to provider stress and anxiety, as did the use of equipment that was not as sophisticated as that to which staff were accustomed. Temperatures reached well into the 110°F range, creating concern for personnel safety. Extreme temperatures also made running simple laboratory tests difficult. Sand storms

raged without warning. Discussing threats and listening to staff concerns about the capabilities of the equipment, the working environment, and the weather prepared them for many eventualities and helped them cope with anxiety. Staff were encouraged to have open discussions among themselves and to support one another, an effective strategy that was used many times during this deployment.

### **Patient care and lessons learned**

On April 15, 2003, the 4th HSB began receiving casualties caused by heat exposure, explosive devices, gunshots, and motor vehicle accidents. The providers at Camp Coyote also were responsible for treating illnesses unique to the country and for attending to the day-to-day medical needs of the troops. In all, from April 15 until June 25, the staff treated more than 200 casualties. It was amazing to see the staff in action, working as a team, mentoring and supporting one another day and night. Each individual knew that he or she could call on a fellow shipmate in time of need. The formula for success included the staff's positive, "can-do" attitude and their strong nursing education in the areas of trauma management and critical thinking. Past experience and key concepts from the TNCC and advanced cardiac life support courses also prepared the nurses for their wartime experience.

Navy Nurse Corps officers led by example. They never asked a lower-ranking officer or enlisted person to do anything they would not do themselves. Selecting the right people for the right job was highly effective, because those with more experience provided education and leadership and knew when it was appropriate to intervene or support other team members. Finally, the nursing leadership of the 4th HSB planned for the worst-case scenarios, and this planning prepared them to be resilient and flexible throughout the deployment. Personnel understood that plans could change at a moment's notice. The term "day off" did not apply. When casualties arrived, everyone joined in to support those on duty.

Lessons learned were that more real-time hands-on training would be desirable in future deployments. Also prior training on the equipment to be used in the field, along with gaining experience at civilian trauma centers, would greatly benefit those who had never treated a trauma patient.

### **Expeditionary Medical Facility Kuwait, 2006**

In the 3 years between the first and second author's deployments, the Navy's medical support in the Kuwaiti theater of operations transitioned from an echelon II to an echelon III facility and was relocated from the northern part of the country to the southern part. Like the Camp Coyote facility in 2003, Detachment B of Expeditionary Medical Facility (EMF) Kuwait in Camp Arifjan in 2006 was a melting pot for both Nurse Corps officers and Hospital Corps staff. The 40 nursing staff members assigned to the Inpatient Nursing Department deployed from 12 MTFs, including ambulatory clinics, small and medium-sized community hospitals, and large tertiary-care teaching facilities. Within these facilities, staff had performed various functions and represented assorted clinical services: administrative, bedside clinician, clinical nurse specialist, and division officer (unit manager). These individuals came from dental, medical/surgical, maternal/child, pediatric, emergency room, intensive care, and post-anesthesia care environments. Although few knew each other before coming together as a full EMF detachment in March 2006, the diverse group, like the 4th HSB, quickly became a cohesive unit that learned to capitalize on one another's strengths (Fig. 6).

The first of two waves of medical personnel arrived in late February 2006 and received turnover information from the outgoing detachment. Three weeks later, the second wave arrived and turned over with the remainder of the outgoing detachment along with the first wave in the EMF's detachment—their new "shipmates." With less than 2 weeks of orientation and turnover, the group assumed the reins of a four-bed casualty-receiving (CASREC) unit, a four-bed ICU, and 24 medical/surgical beds that could be expanded to a total of 44 beds for a mass-casualty situation. The second author was assigned as head of the 40 staff members and 44 beds of the Inpatient Nursing Department. Staff were divided into four teams, each consisting of four nurses and five corps staff. To capitalize on nurses' advanced knowledge and skills, one nurse who had emergency experience and one nurse who had intensive care experience were assigned to each team. Low numbers of ICU patients at the time provided an opportunity for the staff to expand their knowledge and skills by rotating between the three clinical areas. Teams spent 2 weeks on the ward and 2 weeks in CASREC. They then returned to the ward for 2 weeks, after which they worked in



Fig. 6. Casualty Receiving, US Military Hospital, Kuwait, 2006.

the ICU for 2 weeks. If there were no patients in the ICU, the nurse would cross-train in the post-anesthesia care unit or the operating room or would serve as an additional nurse in CASREC or on the ward, as needed. Ancillary services included laboratory, pharmacy, and radiology. Medical and dental specialties available during the 6-month rotation included anesthesia, general surgery, gynecology, orthopedics, internal medicine, cardiology, gastroenterology, infectious disease, pulmonology, pediatrics, psychiatry, dentistry, and oral surgery. Gastroenterologists, infectious disease specialists, and pediatricians were deployed as general internists, but their respective specialty skills proved to be quite useful.

As noted in Fig. 7, the main hospital building consisted of five interconnecting sets of modular tents placed parallel to one another. One main perpendicular passageway through the center of each tent connected neighboring tents with one another. Additional tents housed administration, communications, supplies, the armory, and operations.

### Assessment of personnel

The second author rapidly realized that an assessment of the knowledge and skill of the recently arrived new personnel was required. This assessment was accomplished in three ways.

Initially, to provide an opportunity for all staff to learn a little bit about each other, brief self-introductions were made at a staff meeting. This author and her senior enlisted leader then met individually with each of the staff members to learn more about their personal and clinical backgrounds, strengths, and goals for the 6-month deployment. She then developed and conducted an educational needs assessment based on the current and future conditions for the expected patient population.

To assess the educational needs of the staff properly, it was important to determine the expected patient population for the next 6 months. A review of the admission International Classification of Diseases (edition 9) codes for the prior months of February and March revealed that chest pain, appendicitis/status-post appendectomy, hernia/status-post hernia repair, and cellulitis were the top four admission diagnoses. Realizing that the knowledge and skill levels of the staff were varied and that there was a potential for receiving high-acuity patients, she assessed the need for staff training to care for these possible high-volume or high-risk diagnoses. She also assessed equipment-training needs for these higher-acuity conditions.

A review of the results from a staff educational needs survey revealed that they had little to no knowledge or experience caring for critically ill or





Fig. 7. Expeditionary Medical Facility, Kuwait, 2006.

critically injured patients or in using the equipment seen in a fleet hospital ICU. Working with a fellow clinical nurse specialist, a training plan was developed that included a combination of hour-long continuing education lectures, 10- to 15-minute in-services, skills laboratories, and a plan to perform an educational needs postassessment toward the end of the 6-month deployment. On average, one nursing continuing education lecture and one or two in-services were scheduled each week, in addition to a total of six skills laboratories specifically targeting the topics with the lowest mean knowledge and/or experience scores.

Several months later, the same educational needs survey was redistributed for postassessment purposes. A review of the results revealed the items with the lowest increase in knowledge from the pre- to the postassessment were care of the patient in cardiorespiratory arrest and care of the pulmonary/respiratory patient, probably because, throughout the 6-month deployment, only one patient required cardiopulmonary resuscitation, and only a few had reactive airway disease or pneumonia. Items with the highest increase in knowledge from the pre- to the post-assessment were use of the Alaris MedSystem III infusion pump (Cardinal Health, Dublin, Ohio), cellulitis, care of the patient with wounds, hernias/status-post

hernia repair, and ventilator concepts (eg, modes, settings, weaning). Incidentally, the Alaris MedSystem III infusion pump is the only intravenous infusion pump authorized for use in the military aeromedical evacuation system, but few Navy MTFs use this particular model as the primary pump for intravenous fluid infusion; therefore, in-services on this piece of equipment were needed. As stated previously, cellulitis and hernia/status-post hernia repair were two of the top three admission diagnoses during February and March, and this trend continued through September. Therefore, the increase in knowledge directly reflects the experience acquired with this patient population during this deployment. Although the EMF only had one patient who required mechanical ventilation, this was the topic of one of the continuing education lectures provided by the pulmonologist, who also was certified as an intensivist.

Items with the lowest increase in experience from the pre- to the postassessment were intubation/extubation assistance and cardioversion. Throughout the deployment, only one patient required intubation. Because it was expected that the staff would care for patients requiring intubation/extubation, however, trauma airway management was one of the continuing education lectures provided by one of the EMF's nurse anesthetists.

Items with the highest increase in experience from the pre- to the postassessment were hernia/status-post hernia repair, use of the Welch Allyn Propaq Monitor (Welch Allyn, Beaverton, Oregon), nephrolithiasis, and care of the postoperative patient. Because of its portability and air-worthiness (ie, its capability to function during air transport), the Welch Allyn Propaq Monitor is the cardiac monitoring system found in the fleet hospital system. The EMF used it in the ICU and during ground and aeromedical evacuation. Because of the absence of a central monitoring system, and in lieu of telemetry monitoring, it also was used on the ward for patients requiring cardiac monitoring. Like the Alaris MedSystem III, few Navy MTFs use this equipment as the primary mode of cardiac monitoring. Although data are unavailable at this time regarding the number of patients admitted with nephrolithiasis, it is estimated that two to four patients per month were admitted with this diagnosis. As with changes in knowledge, changes in experience directly reflected the patient population served during the deployment.

Some would view this 6-month experience as a group of individuals in the right place at the right time; others would view this same group as being in the wrong place at the wrong time. As it turns out, the average patient cared for by Detachment B of EMF Kuwait was low acuity, primarily because the location was too far away from the "front-line" to receive combat casualties. This level III facility in southern Kuwait provided garrison-level care but also was a receiving facility for patients requiring specialty services from throughout the Persian Gulf region. This low-acuity population was not the case for Detachment B's predecessors—Detachment A—or successors—Detachment C—who experienced at least one mass-casualty event of higher-acuity patients during each deployment. A forward-deployed level III facility, such as this EMF, would expect to care for more and higher-acuity patients than the second author's detachment did during this particular 6-month deployment.

Ideally, in planning for the staffing of these facilities, 25% of the inpatient nursing department staff should have at least 1 year of emergency nursing experience, 25% should have at least 1 year of ICU experience, and the remaining 50% should have a combination of medical, surgical, and/or psychiatric experience. Because staff are rotated through all clinical areas, and because a primary responsibility of Navy Nurse Corps officers is to train corps staff, at least 75%

of the nurses should be certified in both advanced cardiac life support and TNCC. Because of the operational tempo and the determination to deploy everyone once before any one person was required to return for a second deployment, recommendations regarding clinical experience could not always be met. In this case, any exposure to medical, surgical, mental health, intensive care, or emergency nursing that can be obtained before deployment is beneficial.

## Summary

The authors, in describing their respective experiences in Kuwait, have shown that recognition of required skills and appropriate education provided before deployment is vital to the successful operation of echelon II and III medical facilities. In addition, they demonstrate that the experience gained and the training provided during deployment are essential for optimal outcomes in current and future missions. Because of changes in stability of the area, a better geographic location within Kuwait, a less-acute patient load in general, and improved medical equipment in the Kuwaiti theater of operations, the 2006 mission was able to assess needs systematically, provide formal training, and evaluate the success or failure of that training more easily than could their colleagues from earlier deployments.

Despite their different circumstances, the authors took advantage of every possible opportunity to prepare, train, and support their staff members by expanding their knowledge and skills to provide the best possible care to those warriors entrusted to their care while still in theater.

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